REMARKS

Upon entry of this amendment, independent claim 1 with dependent claims 2 and 4, independent claim 5, and independent claim 6 will be present in the application.

Claims 1 and 5 have been amended to recite that the seal is composed of UHMWPE.

Claims 1, 2 and 5 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. 3,827,305 (Gilson et al.). Claims 1 and 5 have been amended to include the limitation of claim 3. Accordingly, the rejection is moot.

Claims 3, 4 and 6 were rejected under 35 U.S.C. § 103(a) as being obvious over Gilson in view of U.S. 5,747,350 (Sattler). Claims 3, 4 and 6 were also rejected under 35 U.S.C. § 103(a) as being obvious over Gilson in view of U.S. 5,610,069 (Clark et al.). The Office Action admits that the Gilson reference fails to teach that the seal is made of UHMWPE. The Office Action notes that Clark discloses a piston and cylinder dispenser having a seal made of a polyethylene ring and 0-ring combination. The Office Action also notes that Sattler teaches a piston and cylinder dispenser, that polyethylene recognized as having sealing ability, and that polyethylene is an alternative to Teflon. The Office Action contends that it would have been obvious to make the seal of Gilson of polyethylene in order to provide a good surface to surface sliding seal in a dispenser as taught by Sattler or in order to provide a sliding seal in a dispenser as taught by Clark. With respect to the molecular weight, the Office Action contended that it would have been obvious to use any form of polyethylene exhibiting the desired characteristics of Gilson and/or Sattler and/or Clark.

The Applicants respectfully submit that with respect to the use of UHMWPE, there is no basis for the allegation that it would have been obvious to use UHMWPE for the seal of the Gilson reference. The Office Action alleges that it would have been obvious to use any form of polyethylene exhibiting the desired characteristics of Gilson and/or Sattler and/or Clark. However, the only material characteristics taught by the cited references are that the material should be soft, flexible, and deformable. Specifically, Gilson teaches that seal member 86 "is of somewhat soft and flexible plastic material" (Col. 4, lines 45-46). Sattler teaches the use of "deformable materials ... that on the one hand ensure formation of a seal and on the other hand largely avoid dosing errors due to deformation ... during the dosing process. Preferred materials are synthetic materials such as polyethylene, polypropylene, rubber, silicon rubber and also Teflon and synthetic plastics." (Col. 3, line 63, to Col. 4, line 5). Clark teaches the use of a polyethylene wear ring 133, but does not disclose why polyethylene is used in the wear ring or the characteristics of the wear ring (Col. 43, lines 61-63). Thus, the mechanical properties taught by the cited references are vague at best. Comparing the softness, flexibility and deformability characteristics of UHMWPE to those of lower molecular weight polyethylene materials, it can hardly be argued that it would have been obvious, or even logical, to substitute UHMWPE for lower molecular weight polyethylene materials. Given the difficulty in forming products from UHMWPE and the high cost of UHMWPE, compared to lower molecular weight polyethylene materials, it would have been even less obvious/logical to make such a substitution.

PTFE and lower molecular weight polyethylene seal rings meeting the criteria taught by the cited references are used in conventional pipettes. Such pipettes have a high

failure rate, and the mechanism for such failure has not been understood. While PTFE has better wear resistance, better abrasion resistance, and a lower friction coefficient than lower molecular weight polyethylene materials, experiments have shown that PTFE pipette seals have a shorter lifetime than lower molecular weight polyethylene pipette seals. Accordingly, merely substituting UHMWPE, which also has better wear resistance, better abrasion resistance, and a lower friction coefficient than lower molecular weight polyethylene materials, for the "soft and flexible plastic material" of the Gilson seal would not be expected to solve the seal failure problem.

The subject inventors have discovered through experimentation that low load induced creep of conventional PTFE pipette seals results in loss of the pipette sealing grease, and that this combination of events is the failure mechanism for conventional PTFE pipette seals. Although it is well known that PTFE has poor creep resistance under high load, pipette seals are not subjected to high load and therefore it was not suspected that this particular performance characteristic of PTFE would have any impact on the performance of PTFE pipette seals. The inventors have also experimentally proven that the creep resistance of UHMWPE under very low load is much greater than that of PTFE. Given the fact that the creep resistance of UHMWPE under high load is only slightly better than that of PTFE, the degree of difference in the low load creep resistance between the two materials was completely unexpected. Since the cause of the pipette failures was not known, a person of ordinary skill in the art would not have known to substitute a material having a high creep resistance at low load for the material of the Gilson seal. Further, the person of ordinary skill in the art would not have suspected that UHMWPE has a high creep resistance at low load, especially given its rather poor resistance to creep at high load.

"It is insufficient that the prior art disclosed the components of the patented device, either separately or used in other combinations; there must be some teaching, suggestion, or incentive to make the combination made by the inventor." Northern Telecom Inc. v. Datapoint Corp., 15 USPQ2d 1321, 1323 (Fed. Cir. 1990). "There must be something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination." Interconnect Planning Corp. v. Feil, 227 USPQ 543, 551 (Fed. Cir. 1985). As shown above, there is nothing in the prior art that provides the "teaching, suggestion, or incentive to make the combination made by the inventor." Accordingly, the rejection under 35 U.S.C. § 103 must be withdrawn.

The various dependent claims add additional features to the independent claims, and are therefore believed to be allowable. Also, the dependent claims are believed patentably distinct on their own merits as being directed to combinations not suggested by the references.

In view of the above-directed amendments and the proceeding remarks, prompt and favorable reconsideration is respectfully requested.

Respectfully submitted,
Su Yi Liu et al

By _____
Clifford P. Kelly
Registration No. 35,213
Alix, Yale & Ristas, LLP
Attorney for Applicant

750 Main Street
Hartford, CT 06103-2721
(860) 527-9211
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CPK/io